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# GAME REPORT

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## Antelope Management Surveys, 2002

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ANTELOPE MANAGEMENT SURVEYS, 2002

Annual Report

by  
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## ABSTRACT

### ANTELOPE MANAGEMENT SURVEYS, 2002

The annual aerial spring inventory of antelope was conducted from April through June, 2002. From these survey data, the July population of antelope in South Dakota was estimated to be 29,258 and the average doe:fawn ratio was 100:83.

The 2002 antelope rifle season was held from October 5-13. A total of 4,495 resident and 318 nonresident licenses were issued. The projected kill was 4,444 antelope for a 68% success rate. Of the total antelope killed, 67% were bucks and 33% were does.

Archery antelope season was held from August 17 through October 31, 2002. Unit 700A-20 had 701 resident and 199 nonresident licenses issued. Projected kill was 233 antelope for a success rate of 26%. Unit 714B-20 had a total of 10 resident licenses issued, hunter report card returns indicated that one buck antelope was harvested.

## PREFACE

Presented in this report are data gathered during the 2002-2003 fiscal period under Pittman-Robertson Project W-95-R-36 for Study Number 9508, titled Antelope Management Surveys. Jobs included are:

Job 9508-1 Spring Inventory of Antelope  
Job 9508-2 Analyses of Antelope Hunter Report Card Data

Previous reports in this study include a study report from 1973 to present, and separate job reports prior to 1973. Data from this report can be referenced with permission from the author or Secretary of the South Dakota Department of Game, Fish and Parks. Copies of the report are available from the Department of Game, Fish and Parks, Foss Building, 523 East Capitol Avenue, Pierre, South Dakota, 57501.

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## ANTELOPE MANAGEMENT SURVEYS, 2002

### INTRODUCTION

It is estimated that prior to 1800 over 700,000 antelope roamed the prairies of South Dakota. By 1909 antelope were considered extinct east of the Missouri River. In 1924, it was estimated there were 680 antelope in western South Dakota. Through proper game management, antelope numbers had begun to increase by 1937. In 1941, the first aerial counts were conducted, and the population was estimated at 10,000 antelope. Through aerial censusing, the summer antelope population was estimated to be over 67,000 animals in 1983 (Appendix Table 1).

Annual aerial census allows determination of population status, trend, distribution and productivity. Regulated hunter harvest is the most important tool for management of antelope in South Dakota. Ultimate objectives of antelope management are to keep the population well distributed, within landowner tolerance levels and range carrying capacity, and to provide optimum recreational opportunity. Hunting units are established on a flexible unit and permit quota system. The permit quota system enables managers to increase, stabilize or reduce the populations independently of each other and has been effective in South Dakota since 1941. Hunter questionnaire surveys and archery hunter report cards provide harvest information.

### STUDY OBJECTIVES

The objectives of this study are to annually determine status, distribution and harvest characteristics of antelope in South Dakota, and to evaluate the effects of antelope management (harvest) practices.

### JOB 9508-1 SPRING INVENTORY OF ANTELOPE

#### Objectives

To annually determine adult sex ratio, annual reproduction, and total population of antelope, within each county or management unit in the antelope range.

#### Procedures

All counties or portions of counties which were thought to have one or more antelope per two square miles were censused. Those counties or portions of counties which were known to have a density of less than one antelope per two square miles are censused every third year, or sooner based upon a determination by local management personnel. Specific instructions sent to the observers (Conservation Officers) are included as Appendix Table 2.

County areas were blocked into approximately 400 square mile working units delineated by recognizable boundaries. Census area in a work unit consisted of a one-third sample. Transects were a one-half mile wide belt, one-quarter mile on either side of the aircraft, and were oriented in a north-south direction. County road maps were used as aids in locating transects, and antelope

observations were recorded on the map. A unit census summary sheet was prepared for each unit censused. All antelope within the transect were identified by sex and age if possible. If positive identification could not be made, observations were recorded as "unidentified".

Flights to determine doe/fawn ratios were discontinued in 1986 due to a low benefit:cost ratio. Random ground count surveys conducted from June 20-September 30 in each management unit were substituted for the aerial surveys to determine estimates of fawn production. Recommended sample size was 10% of the does in high density units and 50% of the does in low density units. Data collected by the observers were then mailed to the job leader for analysis and comparison with historical doe/fawn ratio information. Current data on populations and doe/fawn ratios was compared to previous years data, and management recommendations to reach season goals were formulated.

### Findings

The aerial census this year began in early May and was finished by late June. The calculated July 2002, antelope population for South Dakota was 29,258 (Appendix Table 3), a decrease of 12% from 2001 (Appendix Table 1). The doe:fawn ratio was 100:83, a 3% decrease from 2001 figures of 100:86.

### Recommendations

1. Due to variability of surveys on a unit basis from year to year and man-hours need to conduct the present survey methodology, research into a new survey should be conducted.
2. There should be a training session on antelope aerial census techniques for all personnel involved.
3. County maps with boundaries should be used by all observers.
4. Survey data should be summarized by year; and an evaluation made concerning the trend, adequacy of sample size and frequency units should be sampled for future management.
5. Populations in all units and potential units should be determined. Ground observations should be used to estimate populations in eastern counties and new units.
6. Doe/fawn ground counts should be used to determine doe:fawn ratios.
7. A 10-year trend analysis of the spring aerial census data should be distributed to all management personnel to encourage greater familiarization of species response to past management practices.



## JOB 9508-2 ANALYSIS OF ANTELOPE HUNTER REPORT CARD DATA

### Objectives

To annually determine composition of antelope harvest, man-days of recreation provided and other hunter information as necessary for evaluating the antelope hunting season.

### Procedures

In 1988, a subsampling hunter questionnaire survey was implemented for the firearm season and in 2000 for the archery season. A random sample of hunters from each season and all units were contacted by mail at the end of the antelope hunting season. Two follow-up mailings were used in order to maximize response and minimize the effect of nonreporters on projected harvest statistics. A minimum acceptability response level has been established as 85% providing harvest estimates within +/- 15% accuracy of the sample statistic. Projections were made solely from reported data. No correction factors are employed. Confidence in projections is (+/-) 10% given that the unit/subunit sampling size is greater than or equal to 50. Collected information may vary annually.

### Findings

Licenses available for the 2002 firearm season included 4,640 (6,240 tags) resident licenses and 376 (504 tags) licenses were available to nonresidents (Appendix Tables 1,4 and 5). The total number of licenses available decreased 4% from the number of licenses available in 2001.

The season was held from October 5 through October 13 in firearm units shown in Appendix Figure 1. Total license sales were 4,495 (6,053 tags) resident licenses and 318 (442 tags) nonresident licenses. The hunter questionnaire survey showed a response rate of 90% and that 4,444 antelope were harvested for a success rate 68% (Appendix Tables 4 and 5). Harvest composition was 67% bucks and 33% does.

The 2002 antelope archery season (Unit 700A-20) was open in the same area, both East and West River, that are open during the firearm antelope season (Appendix Figure 1). Season dates ran from August 17 through October 31 except during a firearm antelope season. Archery antelope licenses in this unit were unlimited and available to residents and non-residents. A total of 701 resident and 199 non-resident licenses were sold (Appendix Table 6). An 88% hunter report card return yielded a projected kill of 233 antelope and a projected success rate of 26%.

A total of 50 licenses were made available in Unit 714B-20. Nonresidents could not start applying until the third drawing. This unit includes Buffalo County and that portion of Brule County north of Interstate .90. Season dates ran from August 17 through October 31 except during a firearm antelope season. Ten of these licenses were sold. One hunters reported harvesting an antelope.

## Recommendations

1. A 10-year trend analysis of hunter report card data should be distributed to all management personnel to encourage greater familiarization of species response to past harvest strategies.

## APPENDIX

Appendix Table 1. Trend in antelope population, firearm license sales and hunter harvest, 1941 - 2002.

Year	Population in Area Censused	Number of Licenses Sold	Number of Antelope Killed
1941	10 000	500	480
1942			
1943	7,973	1,000	976
1944	5,370	500	480
1945	6,721	Closed	*
1946	9,442	700	609
1947	14,800	2,000	1,875
1948	13,000	2,549	2,371
1949	7,425	Closed	
1950	10,920	850	759
1951	14,356	3,350	3,151
1952	16,608	8,350	7,880
1953	15,090	5,244	4,750
1954	16,756	5,700	5,196
1955	16,664	4,850	4,281
1956	19,374	6,266	5,616
1957	16,885	4,415	3,885
1958	16,235	3,300	2,900
1959	20,272	5,569	4,950
1960	23,330	6,708	6,037
1961	27,480	8,596	7,990
1962	26,382	6,991	6,152
1963	27,658	8,090	7,280
1964	24,566	7,470	6,050
1965	27,286	8,750	6,776
1966	20,954	4,965	4,244
1967	23,400	6,547	4,847
1968	22,142	3,229	2,419
1969	23,595	4,382	2,880
1970	25,100	4,850	3,807
1971	34,690	7,004	5,452
1972	34,894	7,225	6,370

Appendix Table 1. Continued.

Year	Population in Area Censused	Number of Licenses Sold	Number of Antelope Killed
1973	33,128	7,770	6,831
1974	41,358	10,114	8,542
1975	43,083	12,139	10,331
1976	33,505	8,340	6,722
1977	40,390	9,335	7,592
1978	28,425	5,849	4,714
1979	18,333	3,128	2,473
1980	25,402	5,236	4,408
1981	37,277	7,804	6,530
1982	53,934	13,899	11,145
1983	67,281	17,439 <sup>a</sup>	14,697
1984	61,644	15,388	16,999
		(22,456 tags)	
1985	48,741	12,656	12,601
		(16,320 tags)	
1986	14,570	1,484	953
1987	15,753	1,690	1,271
1988	20,836	2,274	1,779
1989	34,943	4,433	3,702
1990	31,476	5,104	4,408
		(5,645 tags)	
1991	46,668	7,138	7,542
		(8,537 tags)	
1992	49,010	8,391	8,796
		(11,212 tags)	
1993	49,270	9,506	9,367
		(13,872 tags)	
1994	43,205	7,568	7,254
		(11,1537 tags)	
1995	53,765	8,721	8,752
		(12,707 tags)	
1996	36,266	6,472	5,501
		(7,726 tags)	

Appendix Table 1. Continued.

Year	Population in Area Censused	Number of Licenses Sold	Number of Antelope Killed
1997	20,518	2,901 (2,901 tags)	1,984
1998	19,897	2,749 (2,749 tags)	1,828
1999	29,695	3,651 (3,752 tags)	2,627
2000	33,322	4,165 (4,705 tags)	3,376
2001	33,420	4,965 (6,634 tags)	4,656
2002	29,258	4,813 (6,495 tags)	4,444

<sup>a</sup> Includes 4,000 bonus doe/fawn tags.

Appendix Table 2. Instructions for inventory of antelope in South Dakota.

**For Collecting The Data:**

1. All counties or portions of counties likely to have an antelope season and which are thought to have one or more antelope per two square miles shall be censused annually. Those portions of counties which are considered to have less than one antelope per two square miles will be censused every second year.
2. The census shall start about mid-May in all counties, except Fall River County, which will start in late June. The census shall terminate by July 1 for data compilation.
3. At least three planes shall be used of not less than 115 HP; maximum cruising speed not to exceed 75 mph; windshield and windows to be clean and free from scratches and blemishes which obscure visibility; and pilots must be experienced at low level flying and have a knowledge of the antelope range in South Dakota.
4. Counties to be counted shall be blocked into working units not to exceed 400 square miles. The boundaries shall be delineated by roads, major stream courses, fence lines, or other identifiable topographic features.
5. The census shall consist of 33 1/3% sample based upon 1/2 mile wide belt transects spaced 1 1/2 miles on centerlines or one mile between the edges of the transects. Transect centerlines should be oriented in a north-south direction.
6. Counties with low antelope density, reported heavy winter losses, serious landowner complaints, or marginal counts will be flown 100% when economically feasible. Two 1/2 mile wide belts will be flown on each mile.
7. The census should start in areas where fence lines and roads are common. These features will assist in training the pilot and observer to estimate the 1/4 mile scanning distance and the proper spacing interval.
8. Observers are to devote full-time emphasis to this job when weather permits. Other night work is discouraged to allow for a full night's sleep which will keep fatigue at a minimum. While flying, frequent rest stops should be made. Flight periods should not exceed two hours without landing to rest and stretch.
9. Sufficient altitude should be maintained to allow observations of all terrain within the belt transect. Antelope are more observable at low altitudes.
10. All antelope within the belt transect will be classified as to sex and age if possible. The plane will never alter course to assist in identification. If there is any doubt as to the sex or age of an animal or group of animals, they will be tallied as unclassified.
11. At the end of the census, the individuals doing the field work will prepare small maps of the counties showing the work units. The number of bucks, does and unclassified antelope found in each unit will be totaled up on the antelope census summary sheet.

Appendix Table 2. Continued.

12. Determination of doe:fawn ratios will be made by random, ground counts of does and fawns observed. An attempt will be made to survey 100% of the total projected number of does in each unit during the period of July 15 to September 30.
13. In addition to antelope, all deer observed on each transect will be tallied.
14. The adjacent Conservation Officers will be advised of the survey results as soon as data compilation is completed.

**For Analyzing The Data:**

Antelope numbers will be tabulated for both unit and county populations. This data allows the Department to project the total population of antelope in the state to within 10% of the actual population. Current projected populations will be compared with populations in previous years. Survey data provides information on the adult breeding population and doe/fawn ratio. The doe/fawn ratio shows the annual reproductive success. This particular method has been used since 1941 and has proven adequate in obtaining the information needed to meet the job objectives.



Appendix Table 3. Antelope population by unit census. 2002.

Unit	Bucks	Does	Fawns	Doe:fawn	July Population
102A	21	105	53	100:50	179
102B	42	189	136	100:72	367
102C	96	378	163	100:43	637
III A <sup>A</sup>	35	80	100	100:125 <sup>B</sup>	215
115A <sup>A</sup>	342	795	716	100:90 <sup>B</sup>	1,853
115B <sup>A</sup>	1,590	2,298	2,068	100:90 <sup>B</sup>	5,956
120A	84	141	35	100:25	260
121A	57	192	121	100:63	370
124A	69	99	124	100:125	292
127A	192	411	255	100:62	858
127B	198	543	244	100:45	985
131A <sup>A</sup>	63	246	98	100:40 <sup>B</sup>	407
135A	774	1,140	1,208	100:106	3,122
135B	969	1,293	1,487	100:115	3,749
136A	6	114	63	100:55	183
139A <sup>A</sup>	63	276	110	100:40 <sup>B</sup>	449
141A	75	213	107	100:50	395
145A <sup>A</sup>	48	252	101	100:40 <sup>B</sup>	401
145B	12	150	33	100:22	195
149A	447	681	620	100:91	1,748
149B	174	636	369	100:58	1,179
150A <sup>A</sup>	69	150	60	100:40 <sup>B</sup>	279
153A	180	381	427	100:112	988
153B	360	741	793	100:107	1,894
153C	231	288	288	100:100	807
158A	63	216	153	100:71	432
159A <sup>A</sup>	30	95	50	100:40 <sup>B</sup>	175
160A	36	177	89	100:50	302
163A <sup>A</sup>	15	39	16	100:40 <sup>B</sup>	70
164A	195	201	115	100:57	511
Total	6,536	12,520	10,202	100:83	29,258

<sup>A</sup> July population was estimated.

<sup>B</sup> Doe:fawn ratio was estimated.

<sup>C</sup> Does not include units where estimates were used.

Appendix Table 4. Firearm antelope hunter harvest projections by unit, 2002.

Unit/Type	Resident Licenses		Nonresident Licenses		Response Rate	Success	Harvest Projections		
	Available	Sold	Available	Sold			Bucks	Does	Total
102A-20	20	20		2	82%*	57%	6	7	13
102B-20	20	20	2		94%	87%	17	1	18
202B-20	Landowner	1			100%	100%	1	0	1
102C-20	80	81	6	6	100%	71	53	9	62
202C-20	Landowner	3			67%*	100%	3	0	3
111A-20	10	10	1	1	100%	63%	7	0	7
211A-20	Landowner	1			100%	0%	0	0	0
115A-20	100	100	8	8	92%	59%	55	9	64
215A-20	Landowner	2			100%	0%	0	0	0
115A-24	200	151	16	12	87%	69%	76	36	112
	Second Tag					48%	6	71	77
115B-20	300	202	24	16	86%	62%	122	13	135
215B-20	Landowner	4			50%*	50%	2	0	2
115B-22	200	212	16	4	86%	59%	21	107	128
115B-24	400	403	32	32	88%	73%	273	47	320
	Second Tag					50%	31	185	216
215B-24	Landowner	2			100%	50%	1	0	1
	Second Tag					50%	0	1	1
120A-20	20	20	2		91%	80%	18	0	18
220A-20	Landowner	9			89%	63%	6	0	6
121A-20	50	51	4	4	82%*	67%	35	2	37
124A-20	20	22		0	93%	64%	14	0	14
127A-20	150	153	12	12	94%	73%	103	17	120
227A-20	Landowner	3			100%	67%	2	0	2
127B-20	150	150	12	12	91%	73%	101	18	119
131A-20	20	20	2		82%*	71	16	0	16
231A-20	Landowner	3			67%*	50%	2	0	2
135A-20	300	300	24	24	96%	77%	221	30	251
135A-24	200	203	16	16	84%*	83%	139	42	181
	Second Tag					64%	26	115	141
135B-20	250	250	20	20	89%	78%	190	21	211
235B-20	Landowner	10			70%*	57%	6	0	6
135B-22	100	105	8	3	97%	71%	7	70	77
135B-24	200	201	16	16	93%	89%	170	24	194
	Second Tag					62%	22	113	135
235B-24	Landowner	1			100%	100%	0	1	1
						0%	0	0	0
136A-20	125	132	10	3	83%*	50%	40	28	68
139A-20	20	20		2	100%	58%	13	0	13
239A-20	Landowner	2			100%	100%	2	0	2

Appendix Table 4. Continued.

Unit/Type	Resident Licenses		Nonresident Licenses		Response Rate	Success	Harvest Projections		
	Available	Sold	Available	Sold			Bucks	Does	Total
141 A-20	50	50	4	4	90	54%	21	8	29
241 A-20	Landowner	3			67%	100%	3	0	3
145A-20	50	50	4	4	97%	61%	21	11	32
245A-20	Landowner	1			0%*	0%	0	0	0
145A-22	20	22		0	94%	56%	1	11	12
145B-20	20	21	1		100%	55%	13	0	13
245B-20	Landowner	3			67%*	50%	2	0	2
149A-20	200	200	16	16	90%	63%	129	7	136
249A-20	Landowner	11			91%	100%	11	0	0
149A-24	300	300	24	24	90%	81%	214	50	264
	Second Tag					52%	34	136	170
249A-24	Landowner	2			50%*	0%	0	0	0
	Second Tag				0%	0%	0	0	0
149B-20	200	200	16	16	94%	66%	118	25	143
249B-20	Landowner	8			100%	63%	4	1	5
149B-22	200	64	16	3	80%*	49%	6	27	33
150A-20	60	61	5	4	93%	57%	21	16	37
153A-20	50	50	4	4	94%	79%	40	3	43
253A-20	Landowner	7			71%	100%	7	0	7
153A-24	100	100	8	8	97%	88%	85	10	<b>95</b>
	Second Tag					67%	6	67	73
253A-24	Landowner	3			100%	100%	3	0	3
						100%	0	3	3
153B-20	50	50	4	4	78%*	95%	44	8	52
253B-20	Landowner				100%	100%	2	0	2
153B-24	100	101	8	8	95%	94%	92	11	103
	Second Tag					76%	10	72	82
253B-24	Landowner	2			100%	100%	2	0	2
	Second Tag					0%	0	0	0
153C-20	50	50	4	4	94%	81%	44	0	44
253C-20	Landowner	4			25%*	100%	4	0	4
153C-24	100	100	8	8	95%	97%	96	8	104
	Second Tag					54%	16	43	<b>59</b>
158A-20	20	20	2	2	100%	64%	12	2	14
258A-20	Landowner	3			100%	33%	1	0	1
159A-20	20	21	2	1	92%	83%	17	2	19
160A-20	20	21	2	1	93%	38%	8	0	8
163A-20	25	26	2	1	100%	79%	14	8	22
263A-20	Landowner	1			100%	0%	0	0	0
163A-22	10	11	1	0	100%	100%	3	8	11

Appendix Table 4. Continued.

164A-20	60	61	5	5	80%*	84%	52	4	56
Licenses	4,640	4,495	376	318	90%	68%	2,957	1,487	4,444
Tags	6,240	6,053	504	442					

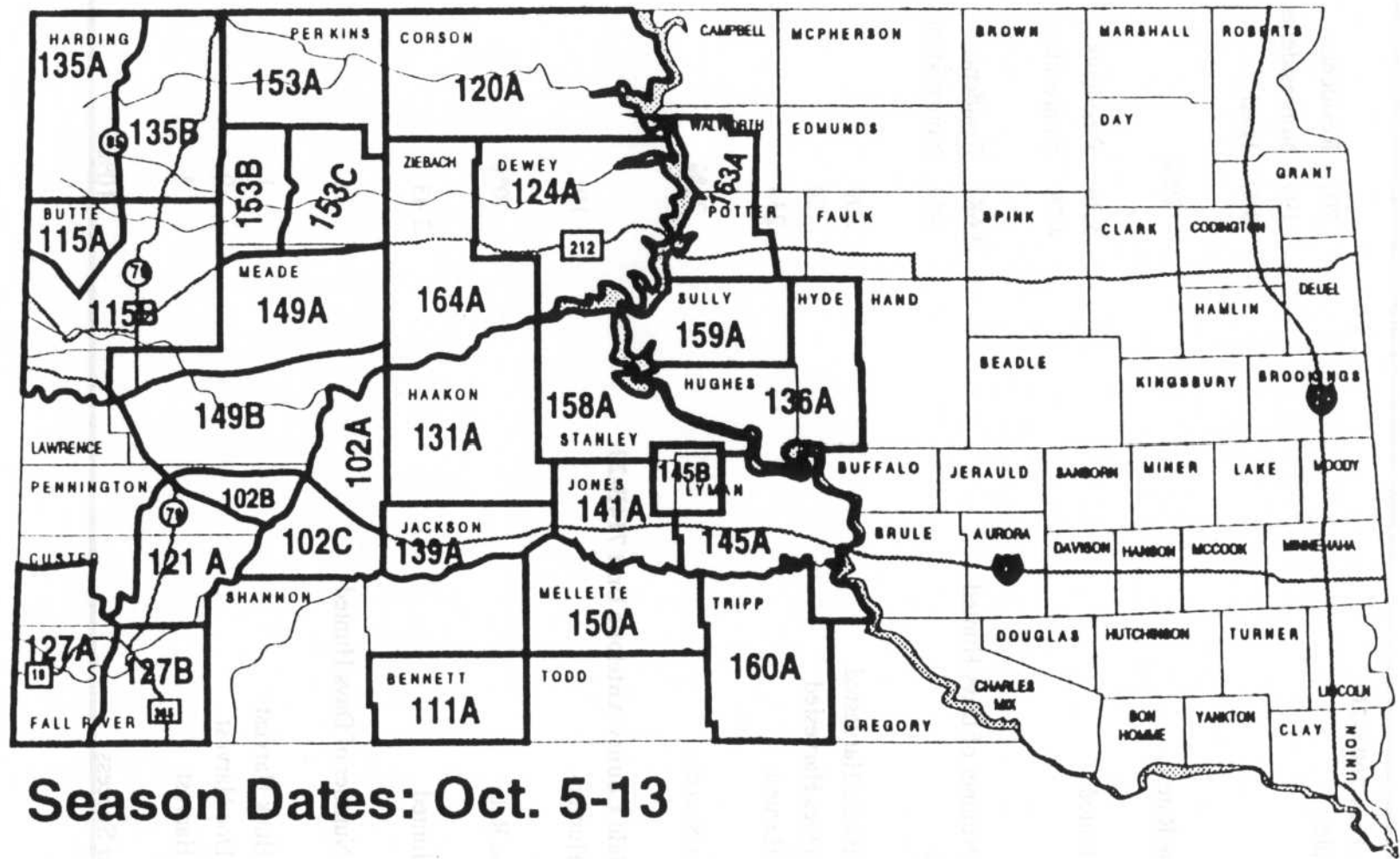
\* These units showed less than 85% response so harvest projections may not be within (+/-) 15% of sample statistic

Appendix Table 5. Firearm antelope hunter questionnaire survey summary. 2002.

Total licensed hunters	4,495 Residents 318 Nonresidents 4,813 Total
Total number of tags issued	6,053 Resident 442 Nonresident 6,495 Total
Survey sample size	2,923
Proportion of all hunters surveyed	61
Overall survey response rate	90°/10
Average days hunted	1.92
Projected number of days hunted	9,241
Projected total bucks harvested	2,957
Projected total doe harvest	1,487
Projected total harvest	4,444
Projected overall success	68%

Appendix Table 6. Summary of archery antelope hunter report card data, 2002.

<b>Main Antelope Unit 700A-20:</b>		
Total License Sales	701	Residents
	199	Nonresidents
	900	Total
Survey Response Rate	88%	
Average Days Hunted	5.26	Residents
	4.78	Nonresidents
Projected Total Number of Days Hunted	3,687	Residents
	951	Nonresidents
Projected Total Bucks Harvested	209	
Projected Total Does Harvested	24	
Projected Total Harvest	233	
Projected Hunter Success	26%	
<b>Brule and Buffalo County Antelope Unit 714B-20:</b>		
Total Licensed Hunters	10	
Survey Response Rate	70%	
Average Days Hunted	2.43	
Projected Total Number of Days Hunted	24	
Projected Total Buck Harvest	1	
Projected Total Doe Harvest	0	
Projected Total Harvest	1	
Projected Hunter Success	10%	



Appendix Figure 1. Firearm antelope units, 2002.